

REMARKS

Claims 15 and 35 are amended. Claims 15-24 and 35-41 are pending in the application.

Claims 15-18, 20, 22, 35 and 38-40 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Mathews U.S. Patent No. 5,658,829 in view of Fukuyama U.S. Patent No. 5,770,100. The Examiner is reminded by direction to MPEP § 2143 that a proper obviousness rejection has the following three requirements: 1) there must be some suggestion or motivation to modify or combine reference teachings; 2) there must be a reasonable expectation of success; and 3) the combined references must teach or suggest all of the claim limitations. Claims 15-18, 20, 22, 35 and 38-40 are allowable over the combination of Mathews and Fukuyama for at least the reason that the references, individually or as combined, fail to disclose or suggest each and every limitation in any of those claims.

As amended, independent claim 15 recites patterning a masking layer to form openings and etching material beneath the masking layer through the openings to extend the openings to outwardly expose a conductive silicon-comprising material at the base of the openings. Claim 15 further recites removing the masking layer and subsequently using an oxygen-comprising plasma to remove a residue from the outwardly exposed conductive silicon-comprising material prior to depositing any material over the substrate. The amendment to claim 15 is supported by the specification at for example page 5, line 22 through page 6, line 9; and page 6, line 21 through page 7, line 14. Mathews discloses etching an opening through an electrically insulative material to form a contact opening 44 (col. 3, ll. 31-37), removing a masking layer 42, sputter etching facets 48, and using an

oxygen etch to strip the photoresist (col. 3, ll. 43-52). Mathews further discloses formation of a conductive material 52 within contact opening 44 (col. 3, ll. 65-67). The formation of a contact opening and stripping of photoresist with subsequent deposition of a conductive material does not teach or suggest the claim 15 recited removing the masking layer and subsequently utilizing an oxygen-comprising plasma to remove a residue from an outwardly exposed conductive silicon-comprising material prior to formation of any material over the substrate.

Fukuyama discloses treatment of aluminum-containing wiring films which can include treatment with an oxygen-comprising plasma to remove resist from on the aluminum containing wire material (abstract; and col. 7, ll. 7-24). As combined with Mathews, the treatment of aluminum-containing wiring films disclosed by Fukuyama does not contribute toward suggesting the claim 15 recited etching to outwardly expose a conductive silicon-comprising material, removing a masking layer and subsequently utilizing an oxygen-comprising plasma to remove a residue from the outwardly exposed conductive silicon-comprising material prior to formation of any material over the substrate. Accordingly, independent claim 15 is not rendered obvious by the combination of Mathews and Fukuyama and is allowable over these references.

As amended, independent claim 35 recites dry etching to extend openings to expose a monocrystalline silicon substrate material at a base surface of the openings and forming a carbon-containing polymer residue at least partially over the monocrystalline silicon substrate material at the base of the openings during the dry etch period. Claim 35 additionally recites removing photoresist and subsequently plasma etching the carbon-containing polymer residue from the monocrystalline silicon substrate material selectively

relative to BPSG and the monocrystalline silicon substrate material prior to formation of any material over the substrate. Independent claim 35 is allowable over the combination of Mathews and Fukuyama for at least reasons similar to those discussed above with respect to independent claim 15.

Dependent claim 16-18, 20, 22 and 38-40 are allowable over the cited combination of Mathews and Fukuyama for at least the reason that they depend from corresponding allowable base claims 15 and 35.

Dependent claims 19, 21, 23-24, 36-37 and 41 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over various cited combinations of Mathews and one or more of Fukuyama; Brown, U.S. Patent No. 5, 780,359; Chen, U.S. Patent No. 5,704,986 and Nagashima, U.S. Patent No. 5,129,958. As indicated in the present action, Brown is relied upon as teaching a stripping temperature of from 20°C to over 100°C. As further indicated in the present action, Nagashima is relied upon as disclosing ammonia and hydrogen utilization as reducing gas. Chen is indicated as being relied upon as showing utilization of a plasma for volatilizing contaminants at a temperature which is maintained at below 800°C.

However, as combined with one or both of Mathews and Fukuyama, the stripping temperature disclosed by Brown, the utilization of ammonia and hydrogen reducing gas as disclosed by Nagashima, and the volatilizing of contaminants at a temperature of below 800°C as disclosed by Chen fail to contribute toward the claim 15 and 35 recited outwardly exposing of conductive silicon or monocrystalline silicon material at a base of an opening and utilizing an oxygen-comprising plasma to remove a residue from the outwardly exposed monocrystalline silicon or conductive silicon material after removing a masking layer and prior to depositing any material over the substrate. Accordingly, independent

claims 15 and 35 are not rendered obvious by the cited combinations of Mathews, Fukuyama, Brown, Chen and Nagashima, and are allowable over these references.

Dependent claims 19, 21, 23-24, 36-37 and 41 are allowable over the cited combinations of Mathews, Fukuyama, Brown, Chen and Nagashima for at least the reasons that they depend from corresponding allowable base claims 15 and 35.

For the reasons discussed above pending claims 15-24 and 35-41 are allowable. According applicant respectively requests formal allowance of such pending claims in the Examiners next action.

Respectfully submitted,

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